RELATIONSHIPS BETWEEN SELECTED INSTITUTIONAL
CHARACTERISTICS AND COMMUNITY POPULATION
PARTICIPATION RATIOS IN COMMUNITY COLLEGES

By

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The major purpose of this study was to determine rela-
tionships of selected institutional characteristics of
public community colleges in Florida and college enrollments
stated as a proportion of the populations of their atten-
dance areas. The study was based upon the work done by
Wattenbarger and Nickens and reported in The IRC Model for
Input-Output Analysis of Student Personnel Services
(Gainesville: Florida Community Junior College Inter-
institutional Research Council, 1973). The variates used
in this study as institutional characteristics were selected
from the student personnel services outputs of the
Wattenbarger and Nickens study. The criterion variable was
participation ratio, the number of students (total headcount)
per thousand of the total population of the attendance area
served by the college.

By factor analyzing 57 selected variates two factors were identified, each containing seven variables which loaded at .40 or higher. Factor 1 contained items relating to services generally offered or available to students at most colleges, and was labeled Student Services. Factor 2 contained items relating to fair treatment of students and was labeled Fair Treatment. Factor 1 correlated .372 and .529 in two independent samples with participation ratio. Negligible correlations were found with factor 2.

The 57 variates were subjected to discriminant function analyses, resulting in the identification of three variables which discriminated between high and low participation ratios. The variables related to student records, financial aid counseling, and campus security. A regression equation was developed with these three variables which was found to predict participation ratio with a rank order correlation of .83. College means of the 57 variates were found to correlate .68 with participation ratio.

The major conclusion drawn from this study was that college environment, as represented by the overall student personnel services program, may have an important relationship to college enrollment.

CHAPTER I

INTRODUCTION

Universality of Educational Opportunity
Development

The concept of equality of educational opportunity is
one which is fundamental to the concept of democracy itself.
The philosophical commitment of a society to provide such
an opportunity for all of its members is a noble and lofty
goal, and one which is difficult indeed to achieve. It is
clear that a majority of the people in the United States have
accepted that commitment, even though there is as yet no
real consensus as to its ultimate dimensions. Even so, the
resulting development of American education is clearly dis-
tinguishable from that in many other countries of the world,
notably those of Europe. Since the early days of the
republic, education in the United States has been more and
more directed toward meeting the needs of all of the people,
in contrast to the elitist systems of France, Germany, and,
until recent times, the United Kingdom.[1]

The goal of ultimate equality in educational opportunity
has not been fully realized in this country, but there is

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[1]Edmund J. Gleazer, Jr. (ed.), American Junior Colleges
(Washington: American Council on Education, 1971), p. 4.

ample evidence of continuing progress toward its eventual achievement. The citizens of the nation, through their state and local governments, and more recently on the national level as well, have shown an increasing concern for education through such legislative actions as laws providing free textbooks, transportation, compulsory attendance, and minimum foundation programs designed to equalize financial support of public schools. Other acts, aided by court interpretations of their meanings, have eradicated any remaining legal bases for discrimination by reason of race, color, religion, sex, or national origin. All of these developments have tended to broaden the concept of universality of educational opportunity and to bring it truly within the grasp of more and more people.

Historically, the concept of universal educational opportunity has been associated with elementary and secondary schools, but it is clear that the nation is moving toward universality in higher education as well. As the United States has become more highly developed industrially, and has been transformed from a mostly rural to an industrial society, the need for increased education of its citizens has been manifest. Thomas R. McConnell stated this position clearly:

> Yet a democratic industrialized society cannot exist
> and grow through the efforts of an elite alone, even
> though the few be selected on the basis of intelli-
> gence rather than privilege. This society rests on
> the service of citizens whose talents are few and

modest together with those whose abilities are many or exceptional.[2]

Growth of Education

The tremendous demand for higher education during the post-World War II period has necessitated a concomitant expansion of facilities to provide that education. A large proportion of the expanding enrollment has been accommodated by the growth of the community colleges throughout the United States. Their number has grown from 610 with an enrollment of about 210,000 in 1940 to 1,141 with 2,866,062 students in 1972.[3] The basic characteristics of the community college are low cost, residential proximity, flexible admission arrangements, and a comprehensive range of educational offerings.[4] With such features it is not surprising that the student consumer group attracted to these colleges is large and very heterogeneous. At the same time junior college enrollment was expanding so rapidly, the institution itself was undergoing a transformation of its role and mission. As first conceptualized, the junior college was merely a separate institution offering the first two years

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[2]Thomas R. McConnell, A General Pattern for American Public Education (New York: McGraw-Hill Book Company, Inc., 1962), pp. 46-47.

[3]Community and Junior College Directory 1973, American Association of Community and Junior Colleges, 1973.

[4]The Open-Door Colleges, Carnegie Commission on Higher Education (New York: McGraw-Hill Book Company, Inc., 1970), p. 3.

of baccalaureate curriculums. By the 1920s, semiprofessional and other terminal educational programs had begun to gain acceptance as the demand for workers with higher skill levels began to be felt. In the period immediately following World War II, adult education began to grow, and gradually the concept of the comprehensive community college began to take shape.[5]

The Community College Movement

The community college movement in the United States has provided the primary means of making universal opportunity for postsecondary education a reality for a growing number of citizens from all walks of life. Medsker has pointed up the diversity of the junior college population in a study of over 13,000 students in ten junior colleges. He found only 53 percent to be of "college age," that is, 22 or younger, and 16 percent were 30 years of age or older.[6] Thornton concludes that a greater proportion of those from less-favored socioeconomic groups attend community colleges than attend senior institutions.[7] Part-time students make up 43 percent of junior college enrollment nationwide.[8] Any

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[5]James W. Thornton, Jr., The Community Junior College (New York: John Wiley and Sons, Inc., 1966), pp. 45-46.

[6]Leland L. Medsker, The Junior College: Progress and Prospect (New York: McGraw-Hill Book Company, Inc., 1960), pp. 29-50.

[7]Thornton, p. 46.

[8]Community and Junior College Directory 1973, p. 86.

measure of its effectiveness on a national scale is most
impressive; yet one can easily find individual states and
areas within states in which educational demands are being
met inadequately. Even such "pace-setter" states as
California, Florida, New York, and Illinois have not provided
levels of educational opportunity sufficiently high to give
us reason for complacency. In the state of Florida, where
99 percent of the college-age population is within commuting
distance of a community college, there is a wide variation
in the proportions of the district population served by the
individual colleges.

Educational Demands

Among the 28 community colleges in Florida in 1972, the
number of students per 1,000 persons in the attendance area
ranged from approximately 7 to 54.[9] Given the geographic
availability of the community college, what characteristics
of the college, the area, and the population are related to
the relative numbers of people who become students at that
college? Can the educational demands of one area differ from
those of another area by a factor of seven or more? It seems
unlikely that differences in demand can account for more
than a small portion of the variation. If such an assumption
is valid, it seems logical to conclude that the educational
demands of the population of an area served by a community

[9]Infra, p. 54.

college with a low proportion of students are not being
completely satisfied.

Participation Ratio

Writing about public education expenditures, Weld
borrowed a term from labor economics, participation rate, to
describe the ratio of the number of full-time equivalent
students to the number of college-age persons in the popula-
tion.[10] Weld was dealing with four-year institutions, which
generally have a small proportion of part-time students and
few students beyond college age, so the term as he used it
probably was appropriate to his requirements. In the case
of community colleges, the target population includes all
ages from the teens to the eighties, and most community
colleges have significant numbers of part-time students.[11]
It is therefore considered that such a term of measurement
applied to community colleges must take into account the entire
target population as well as the known heterogeneity of the
enrollment. This study will use the term participation
ratio to apply to the ratio of total enrollment (headcount)
to total population in thousands in the attendance area of
the college. The wide variation in this ratio found in
Florida, as well as among selected community colleges across

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[10]Edric A. Weld, Jr., "Expenditures for Public Institu-
tions of Higher Education, 1969-70," Journal of Higher
Education, XLIII, pp. 428-440.

[11]Community and Junior College Directory 1973, p. 86.

the country by Wattenbarger, Cage, and Arney, gives rise to
the speculation that some colleges may be responding more
effectively than others to the educational demands of their
populations.[12]

External Factors

It is recognized that an almost infinite number of
factors may go into the college decision equation. Many of
these factors are external to the college; they are called
community variables by Matthews.[13] Demographic and socio-
economic characteristics of a community are obviously related
to the proportion of its population who attain various levels
of education. Atwell found significant correlations between
such factors as percentage of nonwhite population, percentage
of whitecollar employees, and per capita income with educa-
tional output.[14] Matthews reports seven social and economic
characteristics that have been shown by others to be signifi-
cantly related to educational output in one or more research

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[12]James L. Wattenbarger, Bob N. Cage, and Laurence H.
Arney, The Community Junior College: Target Population,
Program Costs and Cost Differentials, National Educational
Finance Project, Special Study Number 6 (Gainesville:
Institute of Higher Education, University of Florida, 1970),
p. 39.

[13]James E. Matthews, A Study of Certain Input-Output
Relationships in Selected Community Junior Colleges (Ed.D.
dissertation, University of Florida, 1971), pp. 36-37.

[14]Charles A. Atwell, Institutional and Community Charac-
teristics Related to the Effectiveness of Transfer Programs
in Florida Public Junior Colleges (Ed.D. dissertation,
University of Florida, 1968), pp. 138-144.

studies.[15]   Consideration of external factors such as these
is outside the scope of this study.

Institutional Characteristics

This investigator is concerned with internal or institu-
tional characteristics of community colleges. He believes,
as does Pace, that the total environment or climate of a
college can be described, and that it may be measured as a
composite of the perceptions of the many individual elements
that make up the institution.[16] The evaluation of the
college environment to be made in this study is based upon
the student personnel services studies conducted by the
Florida Community Junior College Inter-institutional Research
Council in 1972.[17] The items in the instruments used in
these studies are directly related to the ". . . atmosphere,
the style of life, or the general institutional context
within which student learning, growth, and development take
place."[18]

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[15]Matthews, p. 37.

[16]C. Robert Pace, The Measurement of College Environ-
ments, U. S. Department of Health, Education, and Welfare,
Educational Research Information Center (ERIC), ED 033 668, p. 130.

[17]James L. Wattenbarger and John M. Nickens, The IRC
Model for Input-Output Analysis of Student Personnel Services
(Gainesville: Florida Community Junior College Inter-
institutional Research Council, 1973). The writer wishes to
acknowledge the generous permission given him by Drs. Watten-
barger and Nickens, Director and Associate Director, respec-
tively, of the Council, for the use of copyrighted material,
including the basic institutional data, from their study.

[18]Pace, p. 130.

This study has attempted to identify some institutional characteristics which are significantly related to participation ratio.

Statement of the Problem

Purpose of the Study

The purpose of this study was to determine the relationship between selected student personnel output measures and the ratio of students per thousand of the area population served for selected community colleges in Florida, and to draw appropriate conclusions and implications from these relationships.

Questions

The questions to be answered are these:

1. Can certain variables representing measurements of selected student personnel services outputs in community colleges discriminate between colleges with high and low participation ratios?

2. If discriminant functions can be identified, how much of the variation in the participation ratios can be associated with variation of the discriminant functions?

3. What are the implications of the answers to 1 and 2 above for community colleges?

Subproblems

The following subproblems have been identified:

Criterion variable.--The selection and measurement of
a criterion variable appropriate to the purpose of this
study.

Variates.--The selection and measurement of appropriate
variates which will contribute to a description of the
institutional climates of the colleges. These variates were
selected from among 183 variables associated with 37 ques-
tionnaire items assessing student perceptions of student
personnel services outputs which were utilized in a study
entitled Assessment of Outputs for Student Personnel Services,
which was conducted by the Florida Junior College Inter-
institutional Research council in 1972.[19] This outputs study
was preceded by another study called Student Personnel
Services Objectives Assessment in 1971 and 1972.[20] The
objectives assessment study was essentially designed to
validate student personnel services objectives for which
measurement criteria could then be developed and measured by
the outputs assessment study. The development of these two
instruments is described more fully in a later section of
this study entitled Antecedent Studies.[21] The 57 variates
used in this study were selected by the researcher from among
183 variables constituting the IRC Assessment of Outputs
instrument. This selection was made after a careful review
of the literature and related research in the field of

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[19]Wattenbarger and Nickens, Appendix C.

[20]Ibid., Appendix B.   [21]Infra, p. 20.

description of college environments. Acknowledgment must
be made of the seminal work done by Pace in this area.[22]

   Analysis of data.--Analysis of the data collected in
1 and 2 above by means of appropriate statistical procedures,
and the derivation of logical conclusions and implications
for education which may flow from the data analysis.

Hypothesis

   It is hypothesized that there is a significant positive
relationship between the levels of one or more of the selected
student personnel services outputs and the participation
ratios of the 18 community colleges considered in this study.

Limitations and Delimitations

   Limitations.--The principal limitation of this study is
the fact that it is ex post facto research, as characterized
by Kerlinger, and it therefore lacks the basic controls
which are characteristic of true experimental research.[23]
Accordingly, cause and effect relationships may not be
inferred from the results. In this sense it is an associa-
tional study, and any variation in the criterion which may
be related to variation in the variates may only be said to
be associated with and not attributable to the variation of
the variates. It is therefore essential that interpretations

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   [22]Pace.

   [23]Fred N. Kerlinger, Foundations of Behavioral Research
(New York: Holt, Rinehart and Winston, Inc., 1964),
p. 388.

of the results of such a study be derived with great caution.

It is clearly recognized that there are a great many factors which _may_ be related to participation ratio, and thus there are many rival hypotheses which may account for differences in the criterion variable. These "external" factors will be analyzed to the extent possible in order to isolate those common to more than one institution and to assess the degree of differences among institutions. In this way threats to external validity will be at least partially controlled. The generalizability of the conclusions reached will be a function of the extent to which the confounding effects of this variability can be controlled and rival hypotheses explained.

Internal validity will rest largely on methods used in the selection of respondents in the original FCJCIRC studies. These methods will be discussed in detail in a later section entitled Data Sources.[24]

Delimitations.--This study is limited institutionally to 18 community colleges in Florida for which survey data on student personnel services outputs are available from the Florida Community Junior College Inter-institutional Research Council.

Institutional characteristics (variates) are limited to the general area of student personnel services and

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[24]Infra, p. 38.

specifically to the 57 variables selected from those available in the IRC study and thought by this researcher to represent individually and in combination the best descriptions of institutional environment.

Definition of Terms

Participation ratio.--This term is defined as the total enrollment (headcount, full and part time, credit and non-credit) of a college divided by the total population of the attendance area of that college (as defined by the Florida Division of Community Colleges), expressed as the number of students per thousand population.

Institutional characteristics.--This term includes those factors, attributes, policies, and procedures which tend to describe an institution and contribute to its distinctive character.

External factors.--This term is defined as those facts or characteristics pertaining to a geographic area and its population over which a college has little or no influence or control, but which themselves might constitute an influence on the college, its students and faculty, prospective students, or the attitudes of people toward the college.

Justification for the Study

Community College Philosophy

This investigation makes a contribution to the basic body of knowledge concerning the effectiveness with which

community colleges serve their area populations. One of the basic precepts of community college philosophy as explicated by such well-known authorities in the field as Gleazer, Koos, Eells, Reynolds, Thornton, Martorana, Medsker, and Wattenbarger is that the community college should serve the comprehensive educational demands of its area population. The Carnegie Commission on Higher Education identified one of the current problems in higher education to be the discovery of methods of ". . . encouraging . . . two-year colleges and institutions to become more comprehensive and to serve community needs in the manner exemplified by the best of the public community colleges."[25]

Educational Demands

The educational demands of a community are seldom expressed clearly and distinctly; they must be sought out with vigor and zeal by those who have responsibility for meeting those demands. These must be determined on a continuing basis, for it is clear that they are not static. There may be a wide variation in demands from one community to another, and one college can model its programs on some other college only at the possible peril of failing its own community. Even if one grants timely and accurate determination of the community demands, the degree to which their fulfillment is being achieved is subject to great variation.

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[25]The Open-Door Colleges, p. 6.

Enrollment Ratios

Wattenbarger, Cage, and Arney reported the number of
students per 1,000 population for 15 "exemplary" community
colleges across the United States as ranging from 3 per 1,000
to 45 per 1,000.[26] These authors believe that this ratio
may be one measure of how well community colleges are provid-
ing the universal educational opportunity that has become a
commitment of the American people. This work, a satellite
study of the National Educational Finance Project, pointed
out the implications of these statistics for long-range
planning. While national and even statewide estimates of
future enrollments may be based on population projections and
means of the ratios cited above, buildings require long
lead-times and they cannot be built on "mean" sites.

Implications of Enrollment Predictions

Education is an "industry" which generally requires long
lead-times for the accommodation of sizable increases in
demand. Physical facilities are slow in the building, al-
though new planning and construction methods have speeded up
the traditional process. Sometimes the problem of obtaining
funds for capital outlay is even slower than the building
process. Slowest of all is the education and preparation of
additional faculty members to staff new facilities. Since
most private colleges and universities have neither the means

[26]Wattenbarger, Cage, and Arney, p. 39.

nor the commitment to expand their capacities markedly, it falls to the publicly supported institutions, junior and senior, to accommodate the majority of increased demands for higher education. State legislatures are demanding more comprehensive and better-coordinated plans for higher education, supported by more accurate data, before appropriating the large sums requested for the expansion of higher education facilities. Even assuming the availability of adequate financial support, it seems vitally necessary to have accurate and reliable factors upon which to base requirements in order to avoid duplication, waste, and overbuilding on the one hand, and on the other hand failing to provide the means of meeting the legitimate educational needs of the residents of the state.

The same rationale can be applied to the production of college and university professors. Lead-times of five to seven years or more are required to prepare faculty members. If a demand cannot be identified and quantified with some reasonable degree of accuracy several years in advance, it seems clear that many decisions by young people to enter or to refrain from entering the teaching profession may be wrong ones.

Better knowledge of the relationships between college characteristics and enrollment would certainly be of value in the solution of the problem of predicting future educational demand.

College Environment as a Factor in Enrollment

The works of Pace and others have clearly established
that the "environment," "climate," or "atmosphere" of
colleges and universities differ considerably, both among
types of institutions and among institutions of the same
type.[27] Gleazer reports research done by Grimes in which,
after classifying students according to motivational interests,
it was found that four distinct types of students emerged:
the high schooler, the vocationalist, the future careerist,
and the "selfer." Their likes and dislikes were found to
differ in response to questions about college life. These
responses were found to be predictable.[28] Thus it would
appear to be possible in perhaps some instances to control
or design situations in the college environment which would
tend to avoid certain negative reactions or to bring about
positive ones. One could then postulate that avoidance of
negative reactions and stimulation of positive ones through
adjustment of environmental factors would reinforce change
in student perceptions of the institution which would in time
change the reputation or public perception of the college,
causing a possible increase in the number of prospective
students favoring matriculation at that college.

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[27]Pace.

[28]Edmund J. Gleazer, Jr., Project Focus: A Forecast
Study of Community Colleges (New York: McGraw-Hill Book
Company, Inc., 1973), p. 17.

The Environment and Student Personnel Services

In describing the "need-press" theory used in his
early work, Pace pointed out that environmental press had
several components arising from different sources. He cited
academic press, coming largely from the faculty, student
press, coming mainly from the students' peers, and adminis-
trative press, deriving principally from the students' point
of contact with the college administration, the student
personnel services organization.[29]

The policies and procedures of the college in dealing
with its clientele, the students, are important factors in
establishing the total environment of the institution. The
identification, classification, and quantification of the
student personnel services activities should contribute to
the description of the college environment, and point the
way toward its modification to achieve desired ends.

Antecedent Studies

In 1971 the Florida Community Junior College Inter-
institutional Research Council undertook a two-part research
effort to identify, validate, measure the outputs, and
determine the costs of student personnel services in the
public community colleges in the State of Florida.[30] This

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[29]Pace, p. 132.

[30]Wattenbarger and Nickens.

study is basically an ex post facto exploratory field study.
The Council sought to compile data on existing conditions
rather than to predict relations to be found. Such a com-
pilation of quantified variables from a number of institu-
tions is valuable for purposes of comparison among institu-
tions; its lack is that it does not relate any of the
variables to a criterion measure. The study shows, for
example, that College A has attained a higher level of output
of a certain student personnel services strategy by spending
twice as much money per FTE as College B spent on that
strategy. What is does not show is any measurement of this
expenditure against a standard; thus College A does not know
whether it realized any worthwhile return for its money.
The next logical step in using the results of such a study
is to select appropriate criterion measures and relate these
independent variables to them. One might then draw some
conclusions as to the effects of the variates upon the
criterion measure.

CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH

General Approach

Method

The review of the literature and research related to
the subject of this investigation has been approached from
three aspects. The first viewpoint is an examination of the
proposition that the role of the community college in the
overall scheme of postsecondary education is unique, and
therefore the characteristics of the institution itself are
not congruent with the characteristics of other types of
postsecondary institutions. The second approach is an inves-
tigation of the theory and development of the methodology of
the measurement of college environments through the examina-
tion of published works in this area. Finally, there is
examination of representative studies and research works
involving actual measurements of college environments. For
purposes of organization and clarity the entire spectrum of
material relevant to this study will be presented in two
categories; some arbitrary classification will be apparent
because of overlap and instances where the dichotomy is
obscure. The first category is literature, by which is
meant published journal articles and books. The second

category consists of actual research works, principally
doctoral dissertations.

Literature

Ideological Development of Community College Philosophy

In 1971 Goodwin conducted a study of the published writings of a number of well-known authorities in the community junior college field in which he analyzed these writings in terms of ideological positions. From 1890 to 1920 he found such men as William Rainey Harper and David Starr Jordan expounding a concept of "efficiency" which was moralistic and behavior oriented, and part of an effort to reorganize secondary and higher education. From 1920 to 1941, Koos, Eells, and Campbell promoted "terminal" education as an alternative to university preparatory programs. Vocational education was important, but greater stress was placed on general education, education for social intelligence, or "citizenship training." According to Goodwin, community junior college writers since World War II have complained that the movement, in spite of its phenomenal growth, has been largely misunderstood. He says that the increasing number of community college functions without establishment of clear priorities among them has served to diffuse the former strong ideological convictions.[1]

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[1]Gregory L. Goodwin, The Historical Development of the Community Junior College Ideology: An Analysis and Interpretation of the Writings of Selected Community-Junior

Philosophy

The literature is replete with discussions of the philosophy of the community junior college. The Carnegie Commission on Higher Education outlined the principal charac- teristics of the community junior college in its publication, The Open-Door Colleges: Policies for Community Colleges.[2] Medsker and Tillery give a similar list in their Breaking the Access Barriers.[3] Wattenbarger, Cage, and Arney reviewed literature of the foremost writers in the field and developed a list of several characteristics which they felt distin- guished the community junior college from other types of postsecondary institutions.[4] Among these characteristics were a comprehensive program of studies, an "open-door" admissions policy, and a strong guidance and counseling program. The Carnegie Commission also lists low cost and proximity to home as two additional factors which induce students to attend community colleges.[5]

College National Leaders from 1890 to 1970 (Ph.D. disserta- tion, University of Illinois at Urbana-Champaign, 1971), cited in Dissertation Abstracts, 31:5566-A.

[2]The Open-Door Colleges, pp. 1-2.

[3]Leland L. Medsker and Dale Tillery, Breaking the Access Barriers: A Profile of Two-Year Colleges (New York: McGraw- Hill Book Company, Inc., 1971), p. 137.

[4]Wattenbarger, Cage, and Arney, pp. 24-25.

[5]The Open-Door Colleges, p. 2.

Development of Environmental Measures

Psychologists have studied individual differences for many years, but the study of institutional differences is a pursuit no more than twenty years old. From that time to the present, researchers have begun to probe these differences, and they commonly use the word _environment_ to describe the focus of their research. These efforts have been directed toward exploring new ways of measuring the atmosphere, climate, or general institutional context of these institutions. One of the pioneers in this field of research is C. Robert Pace, whose work has been referred to in an earlier section of this report.[6]

Instruments

The first systematic and objective measuring instrument for characterizing college environments, the College Characteristics Index (CCI), was developed by Pace and Stern and reported in 1958.[7] In a later work, Pace goes on to trace the development of methods and measurements in characterizing institutions. His method is to take the responses of students from different schools and put them into a matrix undifferentiated by school. From this a set of factors is produced representing students' perceptions of environments

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[6]_Supra_, pp. 7, 14, and 15.

[7]C. R. Pace and C. G. Stern, "An Approach to the Measurement of Psychological Characteristics of College Environments," _Journal of Educational Psychology_, 49, pp. 269-277.

in general. Some of the labels given to these factors are
vocational climate, intellectual climate, aspiration level,
student dignity, self-expression, social reform, and others.
His theory was that certain personality needs, such as a
need for order, paralleled an element of environmental
press, or the institutional requirement for order. He did
not find as much parallelism as he had expected, and in later
work he dropped the need-press model. Pace subsequently
developed two later instruments, the College Characteristics
Analysis (CCA), and the College and University Environmental
Scales (CUES). CUES consists basically of a number of state-
ments which the respondent is asked to characterize as true
or false as applied to his college. In scoring CUES, if the
students agree by a majority of two to one or greater on an
item, then that statement is scored as characteristic of that
college. The institutional score is determined by the number
of statements that are characteristic of its environment.
The scales resulting from the grouping of the items are
labeled Scholarship, Awareness, Community, Propriety, and
Practicality.[8]

Astin and Holland developed the Environmental Assess-
ment Technique (EAT) in 1961, which attempts to assess the
environment in terms of eight characteristics of the student
body: size, average intelligence, and six "personal

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[8]Pace, pp. 130-133.

orientations"--Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic--based on the proportion of students in each of six classes of major field.[9]

Comparison of Measurement Methods

Centra sought to determine the extent to which three methods of assessing college environments yield independent measures of college variables. The methods examined were (1) the perceptual approach, which relies on students' reports of the activities and emphases of their institutions, that is, collective perceptions of general characteristics-- this is the method pioneered by Pace and Stern; (2) student self-reports, which requires students to report personal involvement in various activities, their individual goals and personal characteristics; and (3) collection of institutional data. Centra found four factors stable and valid in all three methods:

1. Female cultural vs. male athletic

2. Faculty-student interaction

3. Academic stimulation

4. Activism

He asserts that these factors represent valid descriptions of how institutions differ from each other.[10]

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[9]A. W. Astin and J. L. Holland, "The Environmental Assessment Technique: A Way to Measure College Environments," Journal of Educational Psychology, 52, pp. 308-316.

[10]John A. Centra, "Comparison of Three Methods of Assessing College Environments," Journal of Educational Psychology, 63, pp. 56-62.

Whitney reported a method for representing differences among college environments by reducing multivariate descriptions to a two-dimensional configuration. This method was applied to the Environmental Assessment Technique (EAT) developed by Astin and Holland. The EAT involves the proportion of degrees awarded in certain majors, and is based on the assumption that there are relationships between major field choices and personality characteristics. The personal orientation measures resulting from the EAT represent the relative strength of each of six personality types in the student population. The college's environment is thus defined by the presumed personality characteristics of the dominant student type(s). Using the method described by Cole and Cole, Whitney located p-environmental measures in a p-dimensional space, then projected the measures onto a kind of "best-fitting" plane to assist in interpretation. The profiles of individual colleges were then located on this plane. College environments could then be compared by comparing locations on the plane. Individual colleges could be assessed by comparing their locations with the locations of the six EAT measures (realistic, intellectual, social, conventional, enterprising, and artistic). Whitney points out several possible uses of his technique, the most obvious application being in counseling. If a student wanted to attend a certain college but could not do so because of financial problems or admissions difficulties, other schools

with similar environments could be suggested. Similar
schools in different geographical localities could also be
identified.[11]

The Junior College CUES

In 1963-64, Pace, Johnson, and Hendrix conducted a
research effort aimed at evaluating the College and University Environmental Scales (CUES) as an instrument for
measuring junior college environments. Data were obtained
for 12 colleges in California, 12 in Minnesota, and 8 in
Texas. Pace wanted to accomplish three things: (1) How many
CUES items are inappropriate for junior colleges? (2) Were
certain Cues items nonfunctional for junior colleges, either
because of difficulty level or potential for discrimination?
(3) How do CUES scores of junior colleges compare with those
of universities and liberal arts colleges?

The researchers found that relatively few of the CUES
items were inappropriate for junior colleges, and further
that there was no concentration of these items in any one
scale. The score for any scale could be influenced by no
more than one to four points. In the area of discrimination,
Pace and his colleagues found that standard deviations on
many items tended to be much smaller for community colleges
than for colleges and universities. Such items did not

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[11]Douglas R. Whitney, "A Method for Representing
Differences Among College Environments," Journal of Educational Psychology, 66, pp. 199-202.

discriminate well between the environments of the junior
colleges.

In comparing CUES scores for junior colleges, univer-
sities, and liberal arts colleges, Pace found the junior
colleges to be similar to each other, while there were many
differences in the other two categories. On three of the
scales, the scores of junior colleges covered the middle
segment of the distribution, from moderately low to moderately
high. On the other two scales (Scholarship and Awareness)
their scores fell almost entirely within the lower half of
the possible range.

In evaluating these results, the researchers felt that
there might be one or more additonal scales which ought to
be devised and tried out. None of the CUES scales really
tapped the vocational, technical, job-oriented emphasis
generally prevalent in community colleges. There also might
be a need for items reflecting the remedial and counseling
aspects of junior college programs. With these points in
mind, Pace developed an experimental version of CUES, incor-
porating many new items to cover the desired item content.
Included were items considered to be particularly relevant
to community colleges but at the same time not inappropriate
for some universities. It was hoped that this would allow
for possible emergence of other dimensions.

The new test was then used in a nationwide study of 86
public junior colleges. A preliminary factor analysis of

these items revealed the existence of two rather large
factors, both of which overlap with several of the CUES
dimensions. The first of these factors suggested an expan-
sion of personal and societal interests--a general broaden-
ing of awareness and scholarship. The second factor seemed
to bring items together in a new pattern forming a scale
which Pace called restrictiveness versus responsibility.
This scale discriminated between institutions which in their
general mode of supervision and orderliness tended to be more
like high schools, and those in which their practices reflected
a greater degree of freedom and responsibility on the part
of the students. Tentative labels suggested for these two
dimensions are "expansion" and "responsibility." On the
basis of this research no dimension clearly emerged relating
to the vocational, technical, job-oriented aspect of many
junior college programs.[12]

Environmental Measurements

In a study designed to measure changes in student per-
ceptions, Quay administered CUES to 649 newly registered
students in a community college, and followed with a second
administration of the same instrument near the end of the
first semester. He found that regardless of sex or previous
college experience, expectations held by prospective students

[12]C. Robert Pace, Explorations in the Measurement of
Junior College Environments, University of California at
Los Angeles, Educational Research Information Center, (ERIC)
ED 014 972.

were significantly higher (.01 level) in all of the CUES
dimensions except Propriety than their perceptions measured
one semester later. The means on Propriety were very similar
for males and females. He concluded that expectations on
the other scales could be met by providing more informative
descriptions of the campus so that more realistic expectations
could be developed.[13]

In 1971 Anstett conducted a study of transfer student
perceptions of a campus environment, using a second edition
of the College and University Environmental Scales (CUES II)
as his instrument. Anstett found a relatively high degree
of congruence between the overall perceptions of campus
environment possessed by junior and four-year college trans-
fer students. Results indicated that few differences exist
between the aggregate judgments of campus environment made by
groups of this nature. Since Anstett's subjects had been in
that college for a year, his results tended to support the
proposition that similar perceptions are possessed by differ-
ent groups of students who have experienced the environment
for more than one year. It is noted that the junior college
group scored below the four-year group on the Community and
Propriety scales. Anstett interprets this as indicating a
perception of the university as relatively unfriendly,
possibly because the community college tends to be smaller,

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[13]Alan T. Quay and Arthur A. Dole, "Changes in Commun-
ity College Perceptions Before and After Matriculation,"
Journal of College Student Personnel, 13, pp. 120-125.

is nearer home, and has students who knew each other in high school.[14]

James R. Schoemer conducted a study very similar to Quay's study of changes in perceptions. This study was limited to women and utilized the Stern College Character- istics Index, administered prior to enrollment and at the end of the freshman year. Schoemer found that perceptions declined on all eleven scales as compared to prematriculation expectations. He goes on to discuss causes and remedies for these misperceptions, asserting that improvements will dis- courage attrition, reduce failure, and be a significant factor in improving the general mental health of student populations.[15]

Observing that previous studies of college environments had been restricted to four-year colleges granting the bac- calaureate degree, Richards, Rand, and Rand undertook in 1966 to study the environment of 581 accredited junior colleges in the United States. The purpose of the study was to develop a description of junior college environments by organizing currently available information into a brief pro- file. The basic technique consisted of a factor analysis of 36 measures of junior college characteristics. The study

[14]Robert R. Anstett, "A Study of Transfer Student Per- ceptions of a Campus Environment," National Association of Student Personnel Authorities Journal, 10, pp. 198-205.

[15]James R. Schoemer, "Higher Education Misrepresented-- Who is Responsible?" National Association of Student Person- nel Authorities Journal, 10, pp. 192-197.

was designed to be as nearly as possible a replication of
Astin's 1962 study of four-year colleges.[16] The variables
selected for this study were chosen to include at least
some for all methods then in use in characterizing institu-
tions, and to include as many as possible of the variables
used by Astin in his study of four-year colleges.

Product-moment correlations were computed among the 36
variables, and the resultant correlation matrix was factor
analyzed. The researchers developed six factors describing
junior college environments which they called Cultural
Affluence, ·Technological Specialization, Size, Age, Transfer
Emphasis, and Business Orientation. They found the junior
college factors were not congruent with factors for four-
year colleges.[17]

<div align="center">Research</div>

General

A number of studies have been done in the general area
of college environments, determinants of college choice,
perceptions of colleges, and similar topics. All of the
studies relating to college choice, within the knowledge of
this researcher, have dealt with the choice between <u>types</u>

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[16]A. W. Astin, "An Empirical Characterization of Higher
Education Institutions," <u>Journal of Educational Psychology</u>,
<u>53</u>, pp. 224-235.

[17]J. M. Richards, L. M. Rand, and L. P. Rand, "Descrip-
tion of Junior Colleges," <u>Journal of Educational Psychology</u>,
<u>57</u>, pp. 207-214.

of institutions rather than with comparisons of colleges of
the same type. No study has been discovered which attempted
to evaluate community colleges on a comparative basis in
this context. A number of studies have dealt with the
college environment and institutional characteristics in
various ways.

Research Studies

A most important work in the area of community college
evaluation was done by Matthews at the University of Florida
in 1970. He carried out a study of certain input-output
relationships in selected community junior colleges in which
he discovered a number of significant relationships. Of
particular interest to this study, he found that the junior
colleges which placed greater financial emphasis on student
personnel services had a more comprehensive enrollment of
students and a better completion record by college-parallel
students. Of additional importance, he found ten signifi-
cant relationships between institutional variables and out-
put variables, and only one such relationship between com-
munity variables and output variables.[18]

Atwell investigated the relationships of both community
and institutional characteristics to the success of transfer
students in universities. He attempted to determine rela-
tionships of these variables with success rates of junior
college transfer students in senior institutions. He

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[18]Matthews, pp. 141-145.

identified 14 variables in three five-variable discriminant function equations; nine were environmental factors and only five were related directly to the junior colleges or their students. He concluded that socioeconomic status character- istics played a significant role in transfer effectiveness. Atwell pointed out that one of the most obvious conclusions to be drawn from his work is the need for realistic career and university choices on the part of the junior college student.[19]

Toler measured and analyzed selected community college faculty members' perceptions of organizational climate. His scoring program produced six climate-similarity scores, and he found some significant differences in perceptions re- lated to the type of climate and to membership in various college subsystems. Since Toler's work was confined to faculty members, it is not of special interest to the pur- pose of this study.[20]

Sims' 1966 study was closely related to Atwell's work, previously mentioned. He attempted to relate 25 institu- tional characteristics of the junior college of origin to the upper division grades earned by junior college transfer students. He also used lower division grade point averages and Florida Twelfth Grade Testing Program scores as predictor

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[19]Atwell, p. 132.

[20]Richard G. Toler, A Study of Organizational Climate in Selected Community Junior Colleges (Ed.D. dissertation, University of Colorado, 1971), cited in Dissertation Abstracts, 31:6787-A.

variables. He found no significant correlations which
included only the institutional predictors, and he found all
multiple correlations significant (.05 level), which in-
cluded lower division grades. Sims concluded that institu-
tional characteristics used in this study are not significant
predictors of upper division grades.[21]

In a study conducted at Auburn University in 1964,
Leischuck examined the image of a particular junior college
as perceived by high school seniors, and by the administra-
tion, faculty, and students of that college. Among Leis-
chuck's more important findings, with implications for
community colleges, was that the constituencies of the college
which were studied lacked knowledge about many aspects of the
institution. This was especially true with respect to the
high school seniors. He believes that images can be changed,
and that, if the administration of the college feels that the
image being projected is not the desired one, an effort
could be undertaken to alter it.[22]

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[21]David M. Sims, A Study of the Relationship of Selected
Institutional Characteristics of the Junior College of Origin
to the Academic Performance of Public Junior College Transfer
Students in Four Universities in the University System of
Florida (Ph.D. dissertation, The Florida State University,
1966), cited in Dissertation Abstracts, 27:3679-A.

[22]Gerald S. Leischuck, The Image of Columbus College As
Perceived by Muscogee County High School Seniors, and by the
Administration, Faculty, and Students of Columbus College
(Ed.D. dissertation, Auburn Unviersity, 1964), cited in
Dissertation Abstracts, 25:3358.

Rock's study was somewhat similar to Leischuck's, except that his thrust was an examination of the image identification process rather than the distinctive features of the college in which the study was conducted. He used as his instrument the College Characteristics Index (CCI) developed by C. Robert Pace and mentioned earlier in this study.[23]

Hagstrom studied the differentiated perceptions of a broader group than that of either Leischuck or Rock. He included alumni, local citizens, and high school counselors among his respondents. Hagstrom used another of Pace's instruments, the College and University Environmental Scale (CUES), and adaptations of two questionnaires, one by Burton R. Clark, the other by John L. Holland. One of Hagstrom's important findings was that students new to the college were not able to anticipate its environment; the perceptions of new students on the first day of classes and new students retested after several months were quite different.[24]

Scigliano investigated the relationship of organizational structure and performance in two community colleges. He found a significant positive correlation between faculty

[23]Robert W. Rock, Features of the Pace College Image as Identified by the College Characteristics Index (Ed.D. dissertation, Columbia University, 1963), cited in Dissertation Abstracts, 24:5146.

[24]David A. Hagstrom, College Image and Organizational Character: Differentiated Perceptions of Various Groups in a Junior College (Ed.D. dissertation, University of Illinois, 1966), cited in Dissertation Abstracts, 27:2026.

participation in governance and number of graduates per FTE
enrollment, and that colleges with a higher structuring of
activities showed a greater readiness to change and also
tended to be more "efficient" in terms of the number of
graduates produced.[25]

Strickland studied the relationship of organizational
climate and presidential dogmatism in 29 colleges and tech-
nical institutions in North Carolina. He found no relation-
ship between the extent of the openness of the belief system
(dogmatism) of the president and openness of the organiza-
tional climate of the president-faculty interaction system
of the 29 institutions. He also found no significant rela-
tionship between six selected independent variables--years as
a professional educator, years as an educational administrator,
years as president of an institution, academic background of
president, age of institution, and faculty size--and presi-
dential dogmatism.[26]

Summary

The review of the related literature in the field of
community junior college philosophy indicated that the

[25]John A. Scigliano, Comparative Analysis of Administra-
tive Structure and Performance of Community Junior Colleges
in the State of Florida (Ed.D. dissertation, University of
Florida, 1971), p. 142.

[24]Lloyd D. Strickland, Openness of Organizational
Climate, Presidential Dogmatism, and Selected Independent
Variables Among Institutions Within the North Carolina
Community College System (Ed.D. dissertation, North Carolina

general philosophic approach to education espoused by most
authorities supports the contention that community junior
college philosophy is distinctive and unique in a number of
ways from the views of other types of postsecondary institu-
tions. The philosophical consensus is not universal among
all community junior colleges and this fact should give rise
to differences in college environments which should be de-
tectable through the use of suitable methods.

Review of the literature and related research in the
field of measurement of college environments indicates that
different environments exist, that their differences can be
measured, and that colleges can be identified as being of
different environmental types. The three types of measure-
ment methods most commonly used are (1) student perceptions
of institutional characteristics, (2) student self-reports
of activities, and (3) factor analysis of various available
items of institutional data.

Many researchers have studied institutional climate and
environments, have identified their components (sometimes
called dimensions or scales), and have classified institu-
tions in various ways. Few have attempted to apply any value
judgments to their classifications, or to relate institutional
characteristics to any kind of criterion measure.

It seems clear from the work of Pace and others that the
way students are dealt with by the college is a factor in

State University at Raleigh, 1971), cited in Dissertation
Abstracts, 32:6072-A.

the total environment of the institution, and that the component parts of this factor can be measured by the perceptive approach or the participative approach, or by a combination of both methods. To carry the process one step further involves the selection and measurement of suitable criterion variables. Matthews identified several community college output measures which he used as dependent variables.

The review of the literature and related research has shown both the need for and the feasibility of relating institutional characteristics to appropriate measures of criteria.

CHAPTER III

RESEARCH DESIGN AND PROCEDURES

Design

Nature of the Study

This study was designed to identify a number of insti-
tutional variables associated with a selected group of
community junior colleges in Florida, and to determine the
relationship that might exist between these variables and a
variable defined as participation ratio. Classified accord-
ing to Kerlinger's typology, this study could be character-
ized as an exploratory field study. This author defines a
field study as an ex post facto scientific inquiry aimed at
discovering the relations and interactions among sociological,
psychological, and educational variables in real social
structures. The exploratory type of field study seeks
what is rather than to predict relations to be found.
Kerlinger suggests that there are three purposes for field
studies: (1) to identify significant variables in the field
situation, (2) to discover relationships among the variables,
and (3) to lay a groundwork for later, more systematic and
rigorous testing of hypotheses.[1]

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[1]Kerlinger, pp. 387-388.

Strengths and Weaknesses

Field studies are strong in realism, significance, strength of variables, theory orientation, and heuristic qualities. The realism of the field study is obvious; by definition they occur in real-life settings. There is no laboratory artificiality. There is often strong social significance, but this does not necessarily imply scientific significance. They should not concentrate on the solution of practical problems to the exclusion of developing and testing theoretical constructs. Variables are often strong and their variance great, but there is sometimes so much noise in the communication channel that it is difficult to separate the variables.

Despite these strengths, the field study is a scientific weak cousin of the true experimental study. The most serious weakness is due to its ex post facto character and consequent lack of control through inability to manipulate the independent variable. Whatever degree of control is achieved must be obtained by more indirect and less satisfactory means. Another methodological weakness is lack of precision in measurement. In this study the accuracy of measurement of the variates rests on the validity of student perceptions. Other weaknesses of this type of research are practical problems: feasibility, cost, sampling, and time. To avoid these problems this researcher decided to use data collected for a previously conducted study, thus avoiding these

practical problems, but accepting other weaknesses which may
be inherent in the data due to instruments and sampling
methods.[2] Because of the nonexperimental character of the
study, causal relationships may not be inferred. Extreme
care must be exercised in interpretations of the results of
studies of this type.

This study attempted fo fulfill the three purposes of
field studies outlined by Kerlinger. Significant variables
have been identified in a real situation. Relationships
among these variables have been discovered. And, finally,
some groundwork has been laid for systematic follow-up
studies.

Antecedent Studies

The IRC Student Personnel Studies

Background.--Efficient management of educational en-
deavors is now requiring evaluation of educational outcomes.
Precise definition and management of these outcomes is
becoming necessary. Educational programs supported by
specified objectives, stated strategies, anticipated outcomes,
and projected costs are more likely to be funded than pro-
grams justified only by subjective judgment. To develop
knowledge and tools for just such efficient management, the
Florida Council of Student Affairs requested the assistance
of the Florida Community Junior College Inter-institutional

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[2]Ibid., pp. 388-390.

Research Countil (IRC) to design a model for input-output assessment of student personnel services. The model developed is based on systems analysis methods, essentially a set of quantitative techniques applied to a problem-solving setting. The major steps in this approach were (1) the establishment of student personnel services objectives, (2) the development of related strategies, (3) the collection of data, and (4) the analysis of data. This technique required the development of two instruments, one for the validation of tentative objectives, and a second for measurement of the strategies supporting each of the validated objectives.[3]

Student personnel services objectives assessment.--This study was an effort to validate a number of student personnel services objectives. These objectives were the cumulative result of three workshops conducted in 1971 by the Inter-institutional Research Council and attended by representative student personnel services practitioners from the participating colleges. The listing obtained from the workshops was analyzed and refined by the Director and Associate Director of the Council, together with several other persons recognized as knowledgeable in this field. This refined listing was then sent to the participating colleges, each of which had the opportunity to amend the listing. A final listing of objectives was then compiled by

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[3]Wattenbarger and Nickens, pp. 1-2.

the IRC staff, and was incorporated into an instrument designed to assess their individual validity. This instrument was then distributed to the participating colleges where it was responded to by a representative sample of the faculty and the student body of each institution.[4]

Assessment of outputs for student personnel services.--Items for this instrument were developed and validated in a manner similar to the Objectives Assessment instrument, and were based upon the results of this study. Responses were analyzed and a comprehensive listing of validated objectives was compiled. Criteria were developed in the form of strategies for each objective. Prototype instruments were prepared and tested for reliability by having a panel of community college students interpret the selected strategies and outputs. No item was considered reliable until ten successive students interpreted it similarly. The reliability-tested items were then compiled into instruments designed to measure student and faculty perceptions of actual outputs of each strategy at each of the participating institutions. Since this researcher's purpose related only to student perceptions, faculty responses were not used, and will not be referred to again. This instrument was administered to representative samples of students at each college. Responses were collected, tabulated, keypunched, and recorded on magnetic tape.[5]

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[4]Ibid., p. 3.   [5]Ibid.

The Sample and Data Collection

Since true random selection of respondents was not feasible under the conditions of this study, the samples were chosen in such a manner as to optimize representativeness of the college and to minimize threats to internal and external validity. Actual administration of the instruments was conducted during classes in such required courses as English and mathematics. The actual composition of each sample was checked against normative data for the college population, and the total sample against data for all community college students in Florida and determined to be valid.* It is believed that optimization of representativeness, achieved through the methods just described, is an adequate substitute as a control measure for true random selection of respondents.

<center>Data Sources</center>

Criterion Measure

Data requirements for this study fell in two general categories: (1) that data needed to compute values of the criterion measure, participation ratio, for each community college in the study; and (2) that data needed to provide quantitative values for each of the chosen variates, by individual colleges.

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*Interview with Dr. John M. Nickens, Associate Director, Florida Community Junior College Inter-institutional Research Council, May 17, 1973.

Enrollment data.--The first category of data required
only current enrollment figures for each college and the
population of the counties in the State of Florida. The
latest available comprehensive community college enrollment
data were those for the fall term, 1972. These data had been
supplied to the State Division of Community Colleges as
official reports. These data were compiled by the State
Division of Community Colleges and provided to this writer
in unpublished form.*

Population data.--The decision made early in the study
to use total population as a measure rather than some speci-
fied age grouping, such as college age or all over the age of
17, eased the collection problem. However, the later deci-
sion to use fall, 1972, enrollment figures created an addi-
tional problem. The demands of validity required that the
population and enrollment figures used to compute the parti-
cipation ratio be ideally of the same instant in time. As
a practical matter such coincidence is not possible; some
time lapse would have to be tolerated, but a difference of
a year or two was felt by this writer to be unacceptable.
Since the decennial United States Census data were about two
years old at the time the enrollment data were collected,
they could not be used. Research revealed that future
population estimates by county in the State of Florida are

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*"Summary of Enrollments, Fall, 1972," Division of
Community Colleges, Department of Education, State of Florida,
mimeographed.

made and published periodically by the Bureau of Business
and Economic Research, College of Business Administration,
University of Florida.[6] Population estimates by county were
available in published form for July 1, 1972, based on the
United States Census of 1960 and 1970, and on other known
factors relating to population growth in the State of Florida.
In this manner the time gap was closed to approximately two
to three months, depending on the commencing date of the fall
term in each of the 18 colleges in the study. This was
considered to be the attainable coincidence for purposes of
this study.

Variates

The variates selected for use in this study were chosen
from among 183 variables designed to measure 37 student
personnel services outputs in the IRC Assessment of Outputs
study.[7] Criteria for the selection of these variates were

(1) Items about which students would be likely to have
direct knowledge or personal experience.

(2) Items which appeared to relate most directly to and
be descriptive of the institutional environmental press as
described by Pace.[8]

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[6]Florida Statistical Abstract 1971, Bureau of Business
and Economic Research, College of Business Administ ation,
University of Florida (Gainesville: University of Florida
Press, 1971), p. 30.

[7]Wattenbarger and Nickens, p. 44.

[8]Pace, The Measurement of College Environments, pp. 130-
132.

(3) Elimination of items which appeared to relate to student characteristics rather than institutional characteristics.

Selected variates.--Application of the above stated criteria resulted in the selection of the following variates for use in this study. The original variable numbers used in the IRC study were retained for ease of data manipulation by computer, and will be used throughout this study.

Variable Number	Item
001	Have you had opportunities to participate in college governance related activities?
009	Have you ever requested that your official records be shown to you?
010	Were the records shown to you on request?
021	Did you know the requirements for admission to your desired program before applying for admission to the program?
022	After applying for admission to this college, how long did you have to wait for notice of acceptance?
023	Is career counseling provided at your college?
025	Have you used this service?
028	Were you treated fairly during career counseling?
029	Is personal counseling provided at your college?
031	Have you used this service?
034	Were you treated fairly during personal counseling?

035	Is job placement service provided at your college?
037	Have you used this service?
040	Were you treated fairly during job placement?
041	Is academic advisement provided at your college?
043	Have you used this service?
046	Were you treated fairly during academic advisement?
047	Is financial aid provided at your college?
049	Have you used this service?
052	Were you treated fairly in the financial aid process?
053	Are student activities provided at your college?
055	Have you used this service?
058	Were you treated fairly in student activities?
059	Are student health services provided at your college?
061	Have you used this service?
064	Were you treated fairly in student health services?
065	Is drug information service provided at your college?
067	Have you used this service?
070	Were you treated fairly while using drug information service?
078	I would have enrolled in another career program had I known it was offered by the college prior to my first registration.

079   I would have liked more assistance in choosing a career program.

080   I would have liked more information on what career programs were available at this college prior to first registration.

083   By the time of registration, did you have the general requirements for completion of your program in writing?

084   Do citizens of your community know what courses are available in the community college at least three weeks before registration?

085   Has the college maintained good public relations?

086   How long does it usually take you to satisfactorily complete registration (or preregistration)?

089   Have you ever asked in person for a copy of your transcript?

090   Were you given the transcripts at the time of your request?

091   Have you ever requested financial aid through your college?

099   Did you receive any aid?

102   Do you plan to transfer to a senior institution?

103   Do you know how to apply for financial aid from the senior institution?

104   Do you know what lower division courses are required for your major at the senior institution?

105   Is adequate security maintained on the campus (including the parking area) to insure safety of person and property?

115   Have you been able to select career courses appropriate for your career choice?

117	Do you know how to properly withdraw from college?
118	How soon after final examinations do you usually receive your grade reports?
172	Does your college have a student code of conduct?
174	If you have had academic or disciplinary action taken against you, did you know the reasons for such action?
	At your college is assistance offered to students in
176	Choice of life style
177	Examination of your values
178	Understanding yourself
179	Understanding your interpersonal relationships
	Are the following readily available to students on or near campus?
180	Food
181	Books
182	School supplies
183	Other necessary materials.

Data Treatment

Overall Plan

The data relating to the 57 selected variates were available on magnetic tape from the Florida Community Junior College Inter-institutional Research Council. These data were in the form of 4,520 individual responses of students

from 18 institutions to the 183 variables represented by the items in the instrument.[9]

The plan for treatment of the data consisted of five basic phases:

1. Factor analysis of the 57 variates.

2. Computation of institutional means of the overall response to each item, using two independent 50 percent samples.

3. Discriminant function analysis of the 57 variates plus any factors discovered in step 1.

4. Multiple regression analysis of the discriminant functions against the dependent (criterion) variable for all 18 colleges. Computation of regression equation. Regression analysis of college means on all 57 variates against participation ratio.

5. Spearman's rank order correlation between ranks based on actual values of participation ratio, and ranks based on values computed from the regression equation developed in step 4.

Factor Analysis

The basic purpose of the factor analysis was to discover whether each item in the instrument measured a discrete dimension, and, if not, the extent to which items clustered into factors and tended to measure the same

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[9]Wattenbarger and Nickens.

dimension. It was decided to use an individual factor loading of .40 as the criterion for inclusion in a factor. Factor analysis is basically a means of reducing the number of variables to be analyzed. If any of the items clustered with a factor loading exceeding .40, they would be eliminated and the factor itself substituted as a variate.

Institutional Means

Since the basic data tape contained individual responses to 183 possible variables, it was necessary to isolate the particular data desired in useful form. This was basically a mechanical operation to pick off student responses by institution to the selected 57 variates. In order to cross-validate the results obtained, two 50 percent random samples were taken, permitting the analysis to be performed independently with each sample. These data were then keypunched onto cards for use in subsequent analyses. These operations were performed through use of the Statistical Package for the Social Sciences.[10]

Discriminant Function Analysis

The purpose of this procedure was to discover whether any of the variates would discriminate between colleges with high participation ratios and those institutions with low participation ratios. These ratios were computed for each

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[10]Norman H. Nie, Dale H. Bent, and C. Hadlai Hull, Statistical Package for the Social Sciences (SPSS) (New Nork: McGraw-Hill Book Company, Inc., 1970).

of the 18 colleges by dividing enrollment by the population
of the designated attendance area and multiplying the
result by 1,000.

Each sample was statistically treated in the same
manner. The discriminant function analysis performed used
the BMD07M (Discriminant Function Analysis) program.[11] The
variates were taken in groups of five, first consecutively
in numerical sequence, and then alternately. The variables
discovered in the factor analysis were analyzed separately.

Variates discovered to be significant for either sample
1 or sample 2, in either the consecutive or alternate group,
were subjected to another analysis. This procedure was
repeated twice. Any variates remaining at this point were
ones whose values should discriminate between colleges with
high participation ratios and those with low ratios.

Regression Analysis

The discriminant functions resulting from step 3 were
run in various combinations in a BMD02R (Multiple Linear
Regression) program with the criterion variables for all 18
colleges to test their discriminating power.[12] This was
carried out independently with sample 1 and sample 2. Those
variates demonstrating the greatest power of discrimination

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[11]Biomedical Computer Programs, University of California
(Berkeley: University of California Press, 1964).

[12]Ibid.

in both samples were selected for the overall regression
equation.

At this point it was decided to perform one additional
operation in an attempt to relate the overall level of out-
put of student personnel services to the participation ratio.
Means of the scores on all 57 variates were computed for
each college and a Pearson product-moment correlation was
determined between these means and the participation ratios.
It was discovered that some inversion of responses to indi-
vidual items was necessary because "yes" replies to most
items represented a higher level of output while in a few
cases the situation was reversed due to the wording of the
question.

Spearman's Rank Order Correlation

A Spearman's rank order correlation was computed from
the ranks based on actual participation ratios and those
computed from the regression equation.

The purpose of this computation was to test the effec-
tiveness of the regression equation.

Summary

The purpose of this chapter was to describe the research
design developed for this study and to set forth the statis-
tical basis upon which it rests. The nature of ex post
facto studies was discussed, along with their strengths and
weaknesses.

The antecedent studies conducted by the Florida Community Junior College Inter-institutional Research Council, from which this study takes its departure, were described. Identification and selection of the variates and the criterion measure were related. Variates were selected from among the items used in the FCJCIRC Assessment of Outputs Study, 57 being chosen for this study. The criterion measure chosen was called participation ratio, defined as the number of students per 1,000 of the area population served by a college.

The plan for treatment of the data called for (1) factor analysis of the variates, (2) discriminant function analysis, (3) multiple regression analysis of discriminant functions against the criterion, (4) correlation of institutional means of the variates with the criterion, (5) development of a regression equation, and (6) computation of a Spearman's rank order correlation to test the regression equation.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

Purposes

The stated purposes of this study were (1) to determine
the relationships between selected student personnel ser-
vices output measures and the ratio of students per 1,000 of
the area population served for selected community colleges
in Florida, and (2) to draw appropriate conclusions and
implications for education from any significant relationships
discovered. The preceding chapter identified the variables
to be investigated and outlined the statistical procedures
to be applied to the data. This chapter will present that
data and an analysis of the statistical findings. The follow-
ing chapter will discuss the results of the analysis and
conclusions drawn therefrom.

Presentation of Data

Institutional Variables

The institutional variables selected for this study are
listed in the previous chapter. There were 4,520 responses
to the instrument used to gather these data, coded by
institution and by variable, and recorded on magnetic tape

by the FCJCIRC. Most of the questions on the instrument were dichotomous, permitting only yes or no answers. A few items permitted up to five possible replies. The form of these data made them easily amenable to statistical manipulation by computer, utilizing standard programs for selected procedures.

Criterion Variable

The selected criterion variable, participation ratio, was computed manually from available values of college enrollment and county population figures. Enrollment data were taken from fall, 1972, reports submitted by the individual colleges to the State Division of Community Colleges. Population data consisted of projections of the July 1, 1972, population for each county in Florida, made by the Bureau of Business and Economic Research of the University of Florida in 1971. Attendance areas for each college are as designated by the Division of Community Colleges. In this state these areas are either single counties or groups of counties, thus obviating any requirement for proportioning or otherwise dividing the population of an individual county. Table 1 reports the population by attendance area for each college. Table 2 shows the fall, 1972, total headcount enrollment for each college. Table 3 displays the computed values of participation ratio (PR) for 27 of the 28 community colleges in Florida.* Nine colleges

*Pasco-Hernando Community College opened in the fall of 1972 and is not included for that reason.

did not participate in the assessment of outputs phase of the FCJCIRC study and therefore are not included in this investigation. They are included in this table for information purposes.

TABLE 1

POPULATION BY COLLEGE ATTENDANCE AREAS,
JULY 1, 1972

College	Counties		Population
Brevard	Brevard		234,000
Broward	Broward		681,500
Central Florida	Marion		72,800
	Citrus		21,600
	Levy		13,400
		Total	107,800
Chipola	Jackson		34,600
	Holmes		10,800
	Calhoun		7,700
	Washington		12,700
		Total	65,800
Daytona Beach	Volusia		180,100
	Flagler		4,700
		Total	184,800
Edison	Lee		120,400
	Collier		42,900
	Charlotte		30,700
	Hendry		12,600
	Glades		3,800
		Total	220,400
Florida Junior College at Jacksonville	Duval		546,900
	Nassau		21,500
		Total	568,400
Florida Keys	Monroe		53,000

TABLE 1--(continued)

College	Counties		Population
Gulf Coast	Bay		77,100
	Gulf		10,200
		Total	87,300
Hillsborough	Hillsborough		508,600
Indian River	St. Lucie		53,200
	Indian River		38,200
	Martin		30,800
	Okeechobee		11,800
		Total	134,000
Lake City	Columbia		26,800
	Baker		9,500
	Union		8,100
	Dixie		5,700
	Gilchrist		3,700
		Total	53,800
Lake-Sumter	Lake		72,200
	Sumter		15,600
		Total	87,800
Manatee	Sarasota		130,200
	Manatee		103,200
		Total	233,400
Miami-Dade	Dade		1,340,000
North Florida	Suwanee		15,800
	Taylor		13,700
	Madison		13,400
	Jefferson		8,600
	Hamilton		7,800
	Lafayette		2,900
		Total	62,200
Okaloosa-Walton	Okaloosa		93,700
	Walton		16,200
		Total	109,900

TABLE 1--(continued)

College	Counties		Population
Palm Beach	Palm Beach		375,400
Pensacola	Escambia		212,900
	Santa Rosa		40,100
		Total	253,000
Polk	Polk		241,500
Sante Fe	Alachua		111,400
	Bradford		14,800
		Total	126,200
Seminole	Seminole		94,900
South Florida	Highlands		31,400
	Hardee		15,400
	DeSoto		13,500
		Total	60,300
St. Johns River	Putnam		37,200
	Clay		34,800
	St. Johns		32,600
		Total	104,600
St. Petersburg	Pinellas		547,200
Tallahassee	Leon		109,000
	Gadsden		38,700
	Franklin		7,200
	Wakulla		6,600
	Liberty		3,400
		Total	167,900
Valencia	Orange		390,300
	Osceola		28,900
		Total	419,200

Source: Bureau of Business and Economic Research, College of Business Administration, University of Florida.

TABLE 2

FLORIDA COMMUNITY COLLEGE ENROLLMENT,
TOTAL HEADCOUNT, FALL, 1972

College	Enrollment
Brevard	7,203
Broward	9,041
Central Florida	4,415
Chipola	1,522
Daytona Beach	9,508
Edison	3,017
Florida Junior College at Jacksonville	25,658
Florida Keys	1,049
Gulf Coast	3,470
Hillsborough	7,996
Indian River	6,351
Lake City	2,442
Lake-Sumter	1,569
Manatee	7,393
Miami-Dade	39,369
North Florida	1,300
Okaloosa-Walton	4,084
Palm Beach	6,739
Pensacola	11,056
Polk	4,810
Santa Fe	6,548
Seminole	5,103
South Florida	430
St. Johns River	1,216
St. Petersburg	9,398
Tallahassee	2,751
Valencia	4,537

Source: Division of Community Colleges, Department of Education, State of Florida.

TABLE 3

PARTICIPATION RATIOS, FLORIDA COMMUNITY COLLEGES,
FALL, 1972

Rank	College	Ratio
1	Seminole	53.9
2	Santa Fe	51.8
3	Daytona Beach	51.5
4	Indian River	47.4
5	Lake City	45.4
6	Florida Junior College at Jacksonville	45.2
7	*Pensacola	43.7
8	Central Florida	40.9
9	Gulf Coast	39.7
10	*Okaloosa-Walton	37.1
11	*Brevard	30.7
12	Miami-Dade	27.1
13	*Chipola	23.2
14	*North Florida	20.9
15	Polk	19.9
16	Florida Keys	19.8
17	Manatee	18.8
18	*Lake-Sumter	17.9
19	*Palm Beach	17.9
20	St. Petersburg	17.2
21	Tallahassee	16.4
22	Hillsborough	15.9
23	Edison	13.6
24	*Broward	13.2
25	St. Johns River	11.5
26	Valencia	10.8
27	*South Florida	7.1

*These colleges did not participate in the Assessment of
outputs phase of the Florida Community Junior College Inter-
institutional Research Council Student Personnel Services
Studies.

Participation Ratio (PR)

Participation ratios from Table 3 range from a high of 53.9 for Seminole Community College to a low of 7.1 for South Florida Community College. In terms of the percentage of the area population, these ratios are equivalent to enrollments of 5.39 percent and 0.71 percent, respectively, of their area populations. The median ratio is 20.9 and the overall ratio for the state is 25.5. The use of the number of full-time equivalent students (FTE) in lieu of total headcount was given careful consideration. Ratios were computed on an FTE basis, and, although the numerical values were lower, the relative ranking of the colleges showed no significant change. In terms of analyzing the total educational needs of the community, this researcher believes total headcount to be the better measure. Plotting of the ratios along a continuum results in a cluster near the high end and another cluster in the vicinity of the low end, with relatively few near the mean. This investigator believes that the range of ratios, in which the high value is greater than the low value by a factor of more than seven, fully justifies their investigation and analysis.

Factor Analysis

In working with a large number of variables as in this investigation, it is difficult to identify the underlying interrelationships expressed in a correlational matrix. Through the use of factor analysis the minimum number of

separate variables or factors necessary to provide the information contained in a correlational matrix can be estimated. Factor analysis does not directly answer the question of the nature of the interrelationships among the several variables. Rather it seeks to analyze the underlying structure of the interrelationships to determine how many and which variables explain it.[1]

Since all of the data were readily available, it was decided to carry out a factor analysis using the total sample rather than dividing it into smaller fractions. This procedure was carried out using a program from the Statistical Package for the Social Sciences.[2] The result was a varimax rotated factor matrix, the significant portions of which are shown in Table 4. A cutoff value of .40 in the factor loading was selected, below which a variable would not be included in a factor. Seventeen factors were identified; factors 1 and 2 contained seven variables each, while the remaining 15 factors had from one to four variables which loaded at the cutoff value or higher. Based on eigenvalues and common variation accounted for, only factor 1 and factor 2 were studied in detail.

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[1]David J. Fox, The Research Process in Education (New York: Holt, Rinehart and Winston, Inc., 1969), pp. 216-218.

[2]Nie, Bent, and Hull.

TABLE 4

VARIMAX ROTATED FACTOR MATRIX (PARTIAL)

Variable	Factor 1	Factor 2
023	0.51597	
028		0.68153
029	0.61526	
034		0.73937
035	0.67203	
040		0.40306
041	0.57257	
046		0.62149
047	0.72353	
053	0.70707	
058		0.48917
059	0.44438	
064		0.45773
070		0.55467

The variables which clustered under factor 1 with a loading of .40 or more were the following:

023	Is career counseling provided at your college?
029	Is personal counseling provided at your college
035	Is job placement service provided at your college?
041	Is academic advisement provided at your college?
047	Is financial aid provided at your college?

| 053 | Are student activities provided at your college? |
| 059 | Are student health services provided at your college? |

Since all of the variables clustered under factor 1 are related to the traditional types of services found in most student personnel services programs, this factor was labeled Student Services.

The variables which clustered under factor 2 with a loading of .40 or more were the following:

028	Were you treated fairly during career counseling?
034	Were you treated fairly during personal counseling?
040	Were you treated fairly during job placement?
046	Were you treated fairly during academic advisement?
058	Were you treated fairly in student activities?
064	Were you treated fairly in student health services?
070	Were you treated fairly while using drug information services?

Variable 052, Were you treated fairly in the financial aid process? just missed being included in factor 2. Its factor loading was 0.38808. Factor 2 was labeled Fair Treatment.

Factors 1 and 2 accounted for 20.8 and 11.5 percent, respectively, of the variation in the variates, for a total

of 32.3 percent. It was decided to retain these two factors
in order to determine their relationship to the criterion
variable. The remaining 15 factors were either split (vari-
ables loaded on more than one factor) or they reiterated the
first two factors. As the variates were mainly dichotomous,
with a few variates with possible values of 1 through 5, the
factor matrix was non-Gramian, or not positive definite,
making factor scores indeterminant. In order to determine
factor scores for factors 1 and 2, the nondichotomous
variables had to be removed. Examination of the seven
variables in each factor revealed that none was nondichoto-
mous. Factor scores could therefore be computed by adding
the seven values to produce a score on each factor for each
college. This procedure was carried out for each of the
two factors for each of the 18 colleges. The colleges were
then ranked according to their factor scores on each of the
two factors and a Spearman's rank order correlation was
computed. This computation was accomplished for each of the
50 percent samples described in the following section.
Correlations obtained are presented in Table 5.

TABLE 5

CORRELATION OF FACTORS WITH CRITERION MEASURE

	Factor 1	Factor 2
Sample 1	.372	-.024
Sample 2	.529	-.172

Selection of Independent Samples

In preparing for the discriminant function analysis, it was decided that two independent analyses, utilizing random 50 percent samples, would provide some degree of cross-validation and add validity to the results. Consequently, two such samples were drawn from the variate data, using a program from the Statistical Package for the Social Sciences.[3]

The 18 colleges in the study were then ranked in descending order of their participation ratios and the top five and bottom five institutions were selected for discriminant function analysis.

Discriminant Function Analysis

The program used for this procedure was BMD07M (Stepwise Discriminant Analysis).[4] This program performs a multiple discriminant analysis in a stepwise manner. At each step, one variable is entered into the set of discriminating variables. The variable entered is selected according to a set of preestablished criteria. A variable is deleted from the set if its F value becomes too low. Since the number of variables must be less than the number of cases, a series of runs had to be made in order to reduce the number of variables for the final run to less than ten (the number of cases.

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[3]Nie, Bent, and Hull.

[4]Biomedical Computer Programs.

It was decided to run the variables in groups of five, and again two independent methods of grouping were used. The variables were first taken in consecutive groups of five, in ascending numerical order, then taken by grouping alternate numbers, i.e., variables 1, 3, 5, 7, 9 and variables 2, 4, 6, 8, 10. This procedure was carried out for each of the independent 50 percent samples. Factors 1 and 2 from the factor analysis were also run as a separate variable group. The criteria established for carrying a variable over to subsequent runs were that it had to be significant in

(1) At least one group in each sample, or

(2) Both groups in the same sample.

Upon completion of the first series of analyses, 19 variables were retained after having been found significant according to one or both of the above stated criteria. The variables that loaded above .40 in factors 1 and 2 did not prove to be significant in the discriminant analysis and were eliminated from further consideration.

The second series of analyses were carried out with groups of five variables selected consecutively in each sample. Alternate groups of five were not used in this series. To be retained after this series, a variable had to be significant in both samples. This series left eight variables for the third series of analyses. After the same criteria were used as for the second series, five variables remained:

009	Have you ever requested that your official records be shown to you?
023	Is career counseling provided at your college?
037	Have you used the job placement service at your college?
103	Do you know how to apply for finan- cial aid from the senior institution?
105	Is adequate security maintained on the campus (including the parking area) to insure safety of persons and property?

Thus five of the original 57 variables were identified which appeared to discriminate between high and low partici- pation ratios.

Regression Analysis

This procedure was carried out using the BMD02R program, Stepwise Regression.[5] This program computes a sequence of multiple linear regression equations in a stepwise manner. At each step, one variable is added to the regression equation. The variable added is the one which makes the greatest reduction in the error sum of squares.

Various combinations of the five remaining variates were then subjected to the BMD02R analysis, using participation ratios for all 18 colleges and the college means for each of the five significant variables for each of the 50 percent samples. Three of the variates, 009, 103, and 105, had a significant F to enter for both 50 percent samples and were

[5]Biomedical Computer Programs.

selected for the regression equation for the total sample.
The multiple regression coefficient determined was R =
.7589, with R^2 = .576. The regression equation was

$$\hat{Y} = 304.005 - 89.213 \text{ (Var 009)} - 94.005 \text{ (Var 103)}$$
$$+ 25.203 \text{ (Var 105)}.$$

Spearman's Rank Order Correlation

In order to test the validity of the regression equa-
tion, participation ratios for the 18 colleges were computed
by the formula and compared with the ratios previously com-
puted using population and enrollment data. Table 6 shows
the original ranks and the ranks obtained from the regression
equation computation.

TABLE 6

ACTUAL AND REGRESSION EQUATION RANKS OF COMMUNITY
COLLEGES BY PARTICIPATION RATIOS

College	Actual Rank	Regression Equation Rank	Change in Rank
Seminole	1	1	0
Santa Fe	2	7	−5
Daytona Beach	3	3	0
Indian River	4	8	−4
Lake City	5	2	+3
FJC at Jacksonville	6	12	−6
Central Florida	7	5	+2
Gulf Coast	8	4	+4
Miami-Dade	9	11	−2
Polk	10	6	+4
Florida Keys	11	10	+1
Manatee	12	15	−3
St. Petersburg	13	9	+4
Tallahassee	14	14	0
Hillsborough	15	16	−1
Edison	16	13	+3
St. Johns River	17	18	−1
Valencia	18	17	+1

Using the Spearman formula for rank order correlation,

$$\rho = 1 - \frac{6\Sigma D^2}{N(N^2 - 1)},$$

$$\rho = .8303.$$

This correlation is significant at the .01 level (.564 needed for significance). Thus, the variance in the predicted participation ratios that combined the three variates, 009, 103, 105, can be associated with 68.94 percent of the variance in the participation ratios as computed from population and enrollment data.

Multiple Correlation of Means

The final step in the analysis of data in this investigation was to compute a Pearson's product-moment correlation of the institutional mean values of the 57 variates with the participation ratios of the 18 colleges. The purpose of this computation was to determine the relationship between institutional characteristics, as measured by the mean of the variates, and participation ratio. This computation produces a correlation coefficient of .6801, indicating that 47.25 percent of the variation in the participation ratio could be associated with the variance in the variates.

Summary

This chapter has presented the data collected on 18 community colleges and the area population data necessary to this study. Also presented was a description and the results

of the analytical procedures utilized in the reduction of these data.

Derivation of the values of the dependent or criterion variable, participation ratio, was explained and tabulated. Values of the variates were not tabulated in this chapter due to their volume, but their sources, form, and nature were fully described.

The statistical procedures by means of which the data were analyzed were described, and the results of each procedure reported. Factors identified in the factor analysis, significant variates resulting from the discriminant analysis, the regression equation, the Spearman's rank order correlation of college ranks by participation ratio, and the Pearson product-moment correlation of institutional variate means with participation ratios were tabulated. Levels of significance were reported where appropriate.

The presentation and analysis in this chapter will serve as the basis for the discussion of findings to follow in Chapter V.

CHAPTER V

DISCUSSION

Purpose

Goals of the Study

The major purposes of this study were to determine the
relationships between selected student personnel services
output measures and the participation ratios of selected
community colleges in Florida, and to examine the implica-
tions flowing from any relationships discovered. Three
specific questions were posed:[1]

1. Can any of the variates under investigation discrimi-
nate between high and low participation ratios?

2. If such discriminant functions can be identified, what
is their correlation with participation ratio?

3. What are the implications for community colleges of
the answers to questions 1 and 2 above?

The data presentation and analysis contained in the pre-
ceding chapter will be discussed in the light of the overall
purposes and the three specific questions for which answers
were sought.

Institutional Environment

Does the general environment, or climate of an institu-
tion of higher education have an effect on the number and

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[1]Supra, p. 7

types of prospective students who elect to matriculate at that institution? The work of Pace and others indicates rather strongly that it probably does.[2] Review of the literature also indicates that there are significant and measurable differences in environments, both among institutions of the same general classification and among institutions of different types. In developing a strategy for the design of his College Characteristic Analysis, Pace outlined three major categories of factors or characteristics which contribute to the environmental demands, or press, placed upon students: first, administrative sources of press, referring to rules and regulations, general features, and facilities; second, academic or faculty sources of press, referring to characteristics of faculty members, courses and curricula, and instructional practices and demands; and, third, student sources of press, referring to student characteristics, informal activities and interests, and extra-curricular programs.[3]

The thrust of this study derives from this researcher's belief that Pace's postulations are valid, that is, that

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[2]Supra, Chapter II.

[3]Pace, The Measurement of College Environments, p. 130-132. When students enroll in college they are presumably entering a new environment presenting an assortment of expectations and activities, pressures and rewards, facilities and people, to which they must make adaptive responses. These characteristic demands and features, as perceived by the students, are called the environmental press.

administrative press, as perceived by students, defines a
significant portion of the total college environment. He
further believes that the mechanism through which adminis-
trative press is transmitted to the student consists essen-
tially of college rules, regulations and policies, and the
student personnel organization through which they are
applied. Thus a measure of student personnel services is
essentially a measure of student perceptions of a portion of
the overall college environment. This environmental measure
was readily available from the data collected, analyzed, and
reported by the Florida Community Junior College Inter-
institutional Research Council.[4] The question to be dis-
cussed and answered is, "What is the relationship of these
data to the criterion measure?"

<div align="center">Results</div>

Reduction of Number of Variables

The large number of independent variables, or variates,
obviously not of equal importance, presented a problem.
Factor analysis appeared to be a logical procedure to deter-
mine the extent to which two or more of the variates were
providing the same information. Those which clustered
together as a factor could be eliminated as separate variates
and the factor substituted for them. Factor analysis
produced 17 factors, but only 2 of them were considered

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[4]Wattenbarger and Nickens.

strong enough to be retained and labeled. Factor 1 was a logical clustering of items related to student services. It appeared to be supporting the general theory of student personnel services as a measure of administrative press. Factor 2 related entirely to fair treatment at various student services or activities. Here, again, the logic of this clustering seemed apparent. A school in which treatment of students was perceived to be fair would surely have a somewhat different environment from one in which the opposite was the case. These two factors were appropriately labeled Student Services and Fair Treatment. Factor scores were calculated manually for each of the factors for each college, and their relationships to the criterion measure were computed using the Spearman rank order technique. Factor 1, Student Services, correlated .372 and .529, respectively, in the two samples. These moderate correlations underscore the importance of the individual activities or services represented by the variables contained in this factor. Factor 2, Fair Treatment, correlated -.024 and -.172 in the two samples. These very low correlations seem to indicate that fair treatment is unrelated in any important way to enrollment. A close examination of the data reveals that in many of the colleges only very small numbers of respondents in one college, say five, could produce the same numerical score as a number of respondents several times as great in another school. This researcher believes that

the data from these items are not representative of the population under study.

Discriminant Function Analysis

This statistical procedure was used to identify any existing relationships between individual variates or groups of variates and the criterion measure. In the first series of analyses, 32 variables, including 7 variables in either factor 1 or factor 2, were found to be significant discriminators. Upon application of the selection criteria established (must be significant in each sample or in two groups in the same sample) 19 variates remained. Applying similar procedures in two subsequent analyses, all variates were eliminated except 5: 009, 023, 037, 103, and 105. Of these 5 variables only variable 023 was one of those included in a factor, in this case factor 1. Thus, these 5 variables were found to be significant discriminators between high and low values of the criterion variable.

Regression Analysis

In the regression analysis variables 023 and 037 were dropped because they failed to show significance in four out of ten and three out of six cases, respectively. A regression equation was developed, based on the formula,

$$\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3.$$

The following values were determined for the constants:

$$\beta_0 = 304.005$$

$$\beta_1 = -89.213$$

$$\beta_2 = -94.005$$

$$\beta_3 = 25.203$$

Since β_1 and β_2 both have negative coefficients, it appears that large numerical values of X_1 and X_2 tend to reduce the value of $\hat{Y}$, while higher values of X_3 would tend to increase $\hat{Y}$. To appreciate what is happening here, it must be remembered that the original computer coding for the data gathering instrument was yes = 1 and no = 2; thus high numerical values represent negative responses. The combined effect in the equation of the first two coefficients, both negative, is more than seven times greater than the effect of β_3; thus it can been seen that X_3 can have relatively little effect on the predicted value of Y.

The Significant Variables

The variables used in the regression equation are

009	Have you ever requested that your official records be shown to you?
103	Do you know how to apply for financial aid from the senior institution?
105	Is adequate security maintained on the campus (including the parking area) to insure safety of persons and property?

A "yes" response to the first two questions (Variables 009 and 103) tends to produce a higher value of the predicted participation ratio due to the negative sign of the coefficients in the prediction equation. In the case of Variable 009, it appears that the number of students asking to see their records is positively related to participation ratio. For Variable 103, the same positive relationship exists between the number of students who know financial aid procedures at a senior institution and participation ratio.

On the surface, it may appear that the relationship between Variable 009 and participation ratio could be a spurious correlation. Indeed, it may be, but before making such a decision, the underlying relationship between this variable and the original personnel services objectives developed by the FCJCIRC should be examined. One of these objectives, validated through the Student Personnel Services Objectives Assessment, was, "A student's complete official record will be shown to him on his request." Such an objective appears to imply a certain openness and non-secretiveness on the part of a college implementing such an objective, and consequently a possible reduction in the anxiety a student might otherwise feel in a situation where he was not allowed to have access to his own file. The strategy developed by the original investigators to measure the level of output of this objective included two questions, Variable 009, and Variable 010, "Were the records shown to

you on request?" It is therefore considered that Variable 009 might be a proxy variable, and in fact may represent a measure of the type of open and nonthreatening atmosphere described above. If such is the case, it provides a logical explanation for the relationship of this variable with participation ratio.

Variable 103 was developed as one of the strategies to measure the outputs of a series of objectives relating to financial aid matters. The particular objective underlying Variable 103 is, "Community college students will know the procedures for obtaining financial aid at the senior institution before transferring." Here, again, this investigator believes that the question asked in Variable 103 implies more than the mere question itself. A "yes" response to this question might well imply that the college concerned has a very well-developed counseling service, with thorough counselors, interested in their students as individuals, and who succeed in assisting the student to an extraordinary extent. If one accepts such a thesis, then it follows that the relationship between Variable 103 and participation ratio is a logical expectation.

The relationship of Variable 105 to participation ratio appears to admit of no easy explanation. Since this variable has a positive coefficient in the regression equation, a "no" response to the question tends to cause the predicted value of participation ratio to increase. It

stretches the imagination to believe that inadequate security on the campus could possibly influence a prospective student to attend that college. In the opinion of this investigator this is a spurious relationship. In any case, the magnitude of the coefficient, β_3, is such that Variable 105 has relatively little effect on the value of $\hat{Y}$.

Testing the Regression Equation

The regression equation was tested by computing the participation ratios from the regression equation, ranking the colleges accordingly, and computing a Spearman's rank order correlation coefficient for the correlation between these ranks and the ranks determined from participation ratios computed from population and enrollment data. The coefficient was found to be quite high, .8303, significant at the .01 level. The greatest shift in rank was six places, which occurred in one case. Two colleges did not change, while four of them changed only one rank. Thus, 68.94 percent of the variance of the true participation ratios can be associated with the combined variance of the three variates used in the regression equation.

Correlation of College Means and Participation Ratios

The final procedure in the analysis of the data was the establishment of the relationship between the means of the 57 variate scores by institution, and participation ratio. A Pearson product-moment correlation was computed using a

program from the Statistical Package for the Social Sciences.
This coefficient was found to be .6801, significant at the
.001 level; R^2 = .4725, indicating a moderate to strong
correlation between the two variables.

In view of the many other factors which probably influence a college's enrollment, this researcher considers this
the most important finding of this study. The cumulative
effect of the student personnel policies and procedures, as
measured by the mean value of the 57 variates in this study
represents that portion of the total environment that Pace
calls administrative press.[5] Almost half of the variance in
participation ratio can be associated with the variance in
this measure. A high level of measurement in the student
personnel services outputs is considered to be indicative
of a well-rounded, comprehensive, student-oriented, and
effective student personnel services program. If this is
the case, that is, if the perceptions of the students are
accurate, one would expect such a situation to be reflected
favorably in the general reputation of the college, with the
ultimate result being the attraction of a greater number of
prospective students to the college.

Rival Hypotheses

One could postulate many theories which might explain
all or part of the variation in the participation ratios.

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[5]Supra, p. 66.

Some of these hypotheses could be and probably are institutional in nature. For example, this study has not attempted to deal with factors such as faculty or academic press, or student press. In addition to these institutional characteristics are what Matthews calls <u>community variables</u>.[6] They are principally related to the socioeconomic characteristics of the community. Such factors as percentage of nonwhite population, median family income, percentage of whitecollar workers, median school years completed, and a number of others probably are important. Researchers previously cited, such as Matthews, Atwell, and Scigliano, have reported relationships between such variables and educational effectiveness. Another external factor which probably has a negative relationship to community college enrollment is the proximity of other postsecondary institutions. Indian River Community College, which has one of the higher participation ratios of the 18 colleges in this study, has no other institution of higher learning in the immediate vicinity. Valencia Community College, on the other hand, is located only a short distance from a public university. This fact may account at least in part for its low participation ratio. Closer examination of these community factors is beyond the scope of this study.

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[6]Matthews, pp. 36-37.

Summary

This chapter has presented a discussion of the findings of this study in relation to its stated purposes. The outcomes of the various statistical procedures were analyzed and examined in an attempt to lay bare their underlying meanings. Finally, several rival hypotheses which might explain the variance in the criterion measure were set forth. The following chapter will present a summary of the study, together with conclusions and implications.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

Concept of the Study

This study was conceived as an attempt to provide a
partial answer to a question which was not specifically
stated but appeared to this researcher to have been strongly
implied by Wattenbarger, Cage, and Arney.[1] Why do some
community colleges attract as students a far greater pro-
portion of their area populations than do other community
colleges? Many factors came to mind which might be involved
in this equation. Some of these factors are obviously
external to the institution, and, while investigation of
such factors might be extremely interesting from a research
or sociological point of view, this investigator adopted a
more pragmatic approach. External factors such as socio-
economic conditions and demographic characteristics of the
population are generally beyond the capacity of the college
to control or even influence. Any determination of inter-
relationships of such factors with college enrollment would
seem to offer little assistance to a college seeking to
shape its structure and environment to meet more fully the

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[1]Wattenbarger, Cage, and Arney.

educational needs of its community. A more realistic
approach appeared to be to examine the institution itself,
its total climate or environment, and the individual charac-
teristics of the institution which go to make up that environ-
ment. Pace had demonstrated that college environments dif-
fer, and that the differences are measurable.[2] Thus, it was
conceived that a determination of relationships between
institutional characteristics and college enrollments as a
proportion of area population might have some realistic
value.

Purposes

The stated purposes of this study were to determine the
relationships between selected student personnel services
output measures and the ratio of students per 1,000 of the
area population served for selected community colleges in
Florida, and to draw appropriate conclusions and implications
from these relationships.

Questions

The questions to which answers were sought in this study
were:

1. Can certain variables representing measurements of
selected student personnel services outputs in community
colleges discriminate between colleges with high and low
participation ratios?

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[2]Pace, The Measurement of College Environments.

2. If discriminant functions can be identified, how
much of the variation in the participation ratios can be
associated with variation of the discriminant functions?

3. What are the implications of the answers to 1 and
2 above for community colleges?

Hypothesis

It was hypothesized that there is a significant positive
relationship between the levels of one or more of the
selected student personnel services outputs and the partici-
pation ratios of the 18 community colleges considered in
this study.

The Literature

A survey of the literature on the measurement of college
environments was made, together with an examination of a
number of research studies which involved environmental
measurements. Most of the research in this area merely de-
scribed the environment found, or compared environments of
two or more institutions. With the single exception of
Matthews, none related environment to enrollment.[3] The
scarcity of prior research in this area encouraged this
investigator to proceed with this study as it had been con-
ceived.

Review of the literature was also of great assistance
in developing the criteria for selection of the variates
which were used in this study.

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[3]Matthews, pp. 136-141.

Procedures

The foundation of this study was the prior work done
by Wattenbarger, Cage, and Arney,[4] and later by Wattenbarger
and Nickens.[5] The variate data, representing institutional
characteristics, were taken, with permission, directly from
the Wattenbarger and Nickens study.

The 57 variates were factor analyzed, resulting in the
identification of two factors which were labeled Student
Services and Fair Treatment. The computer program used in
this procedure found the factor scores indeterminate due to
the mixture of dichotomous variables with continuous vari-
ables. Factor scores for factors 1 and 2 were computed
manually, and Spearman rank order correlations with the
criterion variable were determined. Student Services corre-
lated .372 and .529, respectively, in samples 1 and 2, with
participation ratio. The factor Fair Treatment correlated
negligibly in both samples. A discriminant analysis was
performed, resulting in identification of three variates
which discriminated quite well between high and low partici-
pation ratios. A very high positive correlation was found
between ranks of colleges computed from the derived regres-
sion equation and ranks computed from enrollment and
population figures.

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[4]Wattenbarger, Cage, and Arney.

[5]Wattenbarger and Nickens.

Finally, a correlation was computed between institutional mean scores on all 57 variates and participation ratio, resulting in a moderately high positive correlation.

Findings

The primary focus of this study was the relationship of the variates (institutional characteristics) to the criterion measure (participation ratio). The results of each of the statistical operations will be set forth and discussed in the order of their establishment.

Factor Analysis

The factor analysis was carried out in the expectation that the number of variables would be reduced and that the factors discovered would be analogous to the dimensions Pace identified in his work.[6] Two strong factors were identified, in each of which seven different variables loaded at .40 or higher. The variables in each group appeared to be clearly related to each other in the manner of Pace's dimensions. These two factors were labeled Student Services and Fair Treatment. These factors were not used in subsequent discriminant analyses because the factor matrix was discovered to be non-Gramian due to the nature of the variables, making factor scores indeterminate. Factor scores for factors 1 and 2 were computed manually, and Spearman rank order correlations with participation ratio were determined.

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[6] Pace, The Measurement of College Environments.

Factor 1 correlated moderately at .372 and .529 for two samples, while factor 2 produced slight correlations of −.024 and −.172.

Discriminant Analysis

The discriminant analysis resulted in three functions which were significant in discrimination between high and low participation ratios.

Regression Analysis and Rank Order Correlation

The three discriminant functions were combined in a regression equation which predicted participation ratios with a correlation of .83. This latter correlation was computed by the Spearman rank order procedure.

Correlation of Institutional Means with Participaton Ratios

The final procedure was the computation of a Pearson product-moment correlation between college means of the 57 variate values with participation which produced a moderately high value of .68.

Conclusions

The conclusions which appear to be warranted by the findings of the study are presented in the following paragraphs, with a brief justification for each.

1. The overall findings tended to support the hypothesis that there is a positive relationship between student

personnel services outputs and participation ratio. Three variates were identified which discriminated well between high and low participation ratios. One of these variates related to administrative procedures, one to counseling, and one to campus security. The relationship of this latter variable to participation ratio is believed to be spurious as no plausible explanation for such a relationship could be conceived.

2. The factor Student Services correlated moderately with participation ratio, indicating that the cumulative effect of the seven variables making up this factor may be positively associated with the variance in the criterion. This result tends to support the hypothesis.

3. Participation ratio can be predicted with reasonable accuracy. The regression equation containing the three variates mentioned in 1 above predicted participation ratios with a Spearman correlation of .83.

4. There is a strong positive relationship between the overall measure of student personnel services and participation ratio. Even though no causal relationship has been established, it appears clear to this investigator that colleges with better student personnel programs tend to be more attractive to prospective students. This conclusion tends to support similar findings reported by Matthews,[7]

[7]Matthews, p. 143.

who found significant relationships between student per-
sonnel service expenditures and educational output variables.

<div align="center">Implications</div>

General

An examination of the data gathered in this study and
the conclusions drawn therefrom suggest one major implica-
tion for community colleges. Most authorities in the com-
munity college field have long asserted that a strong student
personnel services program is one of the key elements of
community college philosophy. This is one of the unique
characteristics of community colleges which generally dis-
tinguishes them from other types of postsecondary institu-
tions. Community college administrators are well advised
to give careful attention to this facet of their programs.
A sound, comprehensive, student-oriented program is essential
to a college which is intent upon meeting the needs of its
students and, indeed, the needs of the community it serves.

Implications for Further Research

A number of areas have been discovered in the course of
this study in which further investigation is needed:

1. The general area of community college environments
should be the subject of further investigation. A reliable
instrument for this purpose needs to be developed so that
environmental studies similar to those done on four-year
institutions can be paralleled for community colleges.

2. The area of academic or faculty press may be just as important or more so than the subject of this study. This investigator believes that curriculum content and especially curriculum comprehensiveness may be related to enrollment and therefore merits investigation.

3. The entire field of external factors mentioned at the beginning of this chapter, particularly the community variables, might be of considerable importance in designing educational programs to meet peculiar community needs.

4. Finally, more and better research into methods of increasing the success rate of community college students would certainly be of value. This has been recommended by Matthews and other researchers. Prevention of dropping out is undeniably one method of improving participation ratio, and it may be a better way than merely trying to find a new student to replace the dropout.

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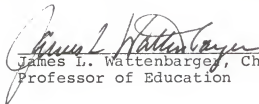
BIOGRAPHICAL SKETCH

James Martin Callender was born September 5, 1919, at Port Neches, Texas. In June, 1936, he graduated from South Park High School, Beaumont, Texas. That same year he entered Lamar College and received the Associate in Arts degree in June, 1938. In July, 1938, he was appointed to the United States Naval Academy from the Second Congressional District of Texas by the late Congressman Martin Dies. He was graduated from the Naval Academy in December, 1941, receiving the degree of Bachelor of Science in Electrical Engineering. He was immediately commissioned a second lieutenant in the United States Marine Corps, in which he served continuously until June, 1971, at which time he was transferred to the Retired List with the rank of colonel. He attended the National War College in 1964-1965, and received the degree of Master of Science in International Affairs from The George Washington University in September, 1965.
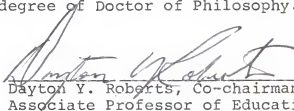
In September, 1971, he entered the Graduate School of the University of Florida and commenced work toward the degree of Doctor of Philosophy.

James Martin Callender is married to the former Nancy Mundy Baldwin of Auburn, New York. They have two sons, twenty-four and nineteen. He is a member of Phi Delta Kappa and several service organizations.
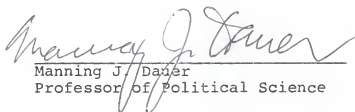
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

James L. Wattenbarger, Chairman
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Dayton Y. Roberts, Co-chairman
Associate Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Manning J. Dauer
Professor of Political Science

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Vynce A. Hines
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Dean of the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1973

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